

CLAIMS

1. A method of collecting vapors from an inspected item, comprising:
providing an item for inspection;
5 forming a chamber around the inspected item, with a volume determined responsive to the inspected item;
applying one or more vapor release measures to the dimensions of the inspected item;
removing gas samples from the formed chamber; and
analyzing the removed gas samples for traces of one or more chemicals.
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2. A method according to claim 1, wherein providing the item for inspection comprises placing the item in a chamber and wherein forming the chamber around the inspected item comprises reducing the volume of the chamber.
- 15 3. A method according to claim 2, wherein reducing the volume of the chamber comprises pumping air out of the chamber.
4. A method according to claim 2, wherein pumping air out of the chamber comprises pumping using a same blower as used for removing gas samples from the inspected items.
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5. A method according to claim 4, wherein the chamber is at least partially defined by a flexible mantle, which conforms to the dimensions of the inspected items when the air is pumped out of the chamber.
- 25 6. A method according to claim 5, wherein after the air is pumped out of the chamber the mantle is spaced from the objects by legs protruding from the mantle.
7. A method according to claim 2, wherein reducing the volume of the chamber comprises moving one or more walls of the chamber toward the inspected item.
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8. A method according to claim 1, wherein forming the chamber comprises forming an air tight chamber.

9. A method according to claim 8, wherein forming the chamber comprises forming a chamber having an pressure lower than its surrounding.

10. A method according to claim 1, wherein providing the item for inspection comprises placing the inspected item on a flexible mantle and wherein forming a chamber around the inspected item comprises connecting portions of the mantle on different sides of the inspected item.

11. A method according to claim 1, wherein forming the chamber around the inspected item comprises connecting a plurality of walls around the provided item, so as to form the inspected chamber.

12. A method according to claim 1, wherein forming the chamber around the inspected item comprises raping a single mantle around the inspected item.

13. A method according to claim 1, wherein forming the chamber comprises forming a chamber having a volume of 20% or less larger than the volume of the inspected item.

14. A method according to claim 1, wherein applying one or more vapor release measures to the inspected item comprises applying one or more gas jets to the inspected item.

15. A method according to claim 14, wherein applying the one or more gas jets and removing the gas samples are controlled together so that the pressure of the chamber follows a desired course.

16. A method according to claim 15, wherein the chamber formed around the inspected item is located within an external chamber and wherein the control of the applied gas jets and the removing of the samples is performed such that relative pressure between the chamber formed around the inspected item and the external chamber is substantially constant.

17. A method according to claim 14, wherein forming the chamber around the inspected item comprises forming the chamber such that at least one wall of the chamber, carrying an

orifice applying a gas jet at the inspected item is within a predetermined distance range from the inspected item.

18. A method according to claim 14, wherein applying one or more air jets at the inspected
5 item comprises applying hot air jets at the item.

19. A method according to claim 14, wherein applying one or more air jets at the inspected item comprises applying intermittent air jets at the item.

10 20. A method according to claim 1, wherein removing gas samples from the formed chamber comprises exhausting through one or more orifices in at least one wall of the chamber.

21. A method according to claim 1, wherein applying one or more vapor release measures to the inspected item comprises vibrating the inspected item.

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22. A method according to claim 1, wherein applying one or more vapor release measures to the inspected item comprises applying shock waves.

23. A method according to claim 1, wherein removing gas samples comprises removing air.

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24. A method according to claim 1, wherein removing gas samples comprises removing a gas other than air.

25. A vapor collection system, comprising:

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a base on which inspected items are placed;

one or more wall portions adapted to form a chamber of a variable volume around items placed on the base;

at least one tube adapted to remove gas samples from the chamber; and

an analysis unit adapted to determine whether the gas samples include one or more

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chemicals.

26. A system according to claim 25, wherein the base and one or more wall portions comprise a single flexible mantle piece.

27. A system according to claim 25, wherein the one or more wall portions comprise one or more flexible mantle pieces.
- 5 28. A system according to claim 25, wherein at least a portion of the at least one tube adapted to remove gas samples is coupled to the one or more flexible mantle pieces.
29. A system according to claim 28, wherein at least a portion of the at least one tube adapted to remove gas samples is embedded within the one or more flexible mantle pieces.
- 10 30. A system according to claim 25, comprising one or more legs protruding from the one or more flexible mantle pieces, which prevent the flexible mantle from closely contacting the inspected items.
- 15 31. A system according to claim 25, wherein the base participates in defining the chamber with the one or more walls.
32. A system according to claim 25, wherein the base does not participate in defining the chamber with the one or more walls.
- 20 33. A system according to claim 25, wherein the at least one tubes are embedded within the one or more walls.
34. A system according to claim 25, comprising a blower adapted to exhaust gas out of the
25 chamber so as to adjust the volume of the chamber.
35. A system according to claim 34, wherein the blower is adapted to remove gas samples from the chamber through the at least one tube.
- 30 36. A system according to claim 34, comprising a compressor adapted to inject gas into the chamber.

37. A system according to claim 36, comprising a controller adapted to control the compressor and the blower such that during a sample collection period of the system, the relative gas pressure between the chamber and the environment around the chamber is substantially constant, while the blower provides gas samples from the chamber to the analysis
5 unit.

38. A vapor collection system, comprising:
one or more wall portions adapted to define a chamber for inspected items;
at least one vapor collection aiding unit; and
10 a mount having an adjustable position, on which the at least one vapor collection aiding unit is mounted.

39. A system according to claim 38, wherein the at least one vapor collection aiding unit comprises a suction nozzle.
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40. A system according to claim 38, wherein the at least one vapor collection aiding unit comprises a unit for inducing vapor release.

41. A system according to claim 40, wherein the unit for inducing vapor release comprises
20 a gas blowing nozzle.

42. A system according to claim 40, wherein the unit for inducing vapor release comprises a heater.

25 43. A system according to claim 38, wherein the mount is one or more of the wall portions.

44. A system according to claim 38, wherein the mount is separate from the wall portions.

45. A system according to claim 38, wherein the position of the mount is adjusted by
30 adjusting the air pressure in the chamber.

46. A method of collecting vapors from an inspected item, comprising:

placing a collection head inside the inspected item, the collection head not being held by a human operator;

removing gas samples from the inspected item through the collection head; and
analyzing the removed gas samples to determine if they include one or more chemicals.

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47. A method according to claim 46, wherein placing the collection head in the inspected item comprises placing a collection head not connected through tubes to an external system.

48. A method according to claim 46, wherein placing the collection head in the inspected
10 item comprises placing a collection head connected through tubes to an external system.

49. A method according to claim 46, comprising closing the inspected item with the collection head in the inspected item.

15 50. A method according to claim 46, comprising applying one or more vapor release measures to the inspected item substantially concurrently with removing the gas samples.

51. A method according to claim 50, wherein applying one or more vapor release measures to the inspected item comprises applying the one or more release measures from the collection
20 head.

52. A method according to claim 50, wherein applying one or more vapor release measures to the inspected item comprises applying the one or more release measures from a unit within the inspected item, separate from the collection head.

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53. A method according to claim 50, wherein applying one or more vapor release measures to the inspected item comprises applying the one or more release measures from apparatus external to the inspected item.

30 54. A method according to claim 50, wherein applying one or more vapor release measures to the inspected item comprises directing air jets at the inspected item.

55. A method according to claim 50, wherein applying one or more vapor release measures to the inspected item comprises vibrating the collection head in order to vibrate the inspected item.
- 5 56. A method according to claim 55, wherein applying one or more vapor release measures to the inspected item comprises inflating and deflating a flexible container of the collection head in order to vibrate the inspected item.
57. A method according to claim 56, comprising collecting gas samples from the inspected
10 item by apparatus external to the inspected item, substantially concurrently with collecting the gas samples through the collection head.
58. A method of collecting vapors from an inspected item, comprising:
placing an internal vapor unit inside the inspected item;
15 placing an external vapor unit outside of the inspected item;
applying a vapor release means at the inspected item from a first one of the external and internal vapor units; and
removing gas samples from the inspected item through a second one of the external and internal vapor units.
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59. A method according to claim 58, wherein the first one of the vapor units comprises the external unit.
60. A method according to claim 59, wherein gas samples are not collected from outside the
25 inspected item.
61. A method according to claim 58, wherein the first one of the vapor units comprises the internal unit.
- 30 62. A method according to claim 61, wherein gas samples are not collected from within the inspected item.

63. A method according to claim 58, comprising additionally applying vapor release means from the second of the external and internal vapor units.
64. A method according to claim 58, comprising additionally removing gas samples from
5 the first of the external and internal vapor units.
65. A method according to claim 58, wherein placing the external vapor unit outside of the inspected item comprises placing the inspected item inside a chamber of the external vapor unit.
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66. A method according to claim 58, wherein placing the external vapor unit outside of the inspected item comprises forming a chamber of the external vapor unit around the inspected item.
67. A method according to claim 58, wherein the internal vapor unit is connected through
15 gas pipes to the external unit.
68. A method according to claim 58, wherein the external and internal vapor units are commonly controlled by a single controller.
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69. A method according to claim 58, wherein the external and internal vapor units are not commonly controlled during their operation.
70. A method according to claim 58, wherein applying vapor release means comprises
25 directing a gas jet at the inspected item.
71. A method according to claim 70, wherein directing a gas jet at the inspected item comprises directing a jet of purified air.
72. A method according to claim 70, wherein directing a gas jet at the inspected item
30 comprises directing a pulsed jet of gas.
73. A method of collecting vapors from an inspected item, comprising:

inserting a vapor release inducing object into the inspected item;
vibrating the vapor release inducing object; and
collecting gas samples from the inspected object.

- 5 74. A method according to claim 73, wherein vibrating the vapor release inducing object comprises inflating and deflating a flexible encasement of the vapor release inducing object.

75. A method according to claim 73, wherein vibrating the vapor release inducing object comprises operating a vibrating motor within the vapor release inducing object.

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76. A method according to claim 73, wherein collecting gas samples comprises collecting from within the inspected item.

77. A method according to claim 73, wherein collecting gas samples comprises collecting
15 from outside of the inspected item.